Device for connecting a carrier part and an add-on part

The invention concerns a device according to the preamble of Patent Claim 1.

Such a device is known from US 6,594,870 B1. The prior device is provided with a connecting part comprising two flange disks connected to each other via an interpiece. Further provided is a receiving part, which is intended to be affixed to an add-on part and is configured as cage-like. On its side facing away from the add-on part, the receiving part is provided with a number of arms designed to permit some degree of lateral movement, which arms are connected inwardly to a ring-like, open receiving element and outwardly, in a fixing region, to side walls of the receiving part. The arms are configured as straight, and extend radially between the receiving element and the fixing region concerned. The interpiece can be inserted into the receiving element so that the flange disks clasp the arms in the region of the receiving element. In addition, the connecting part is implemented with a snap-lock structure. Finally, the prior device has an anchoring part that can be connected to a carrier part. The anchoring part is configured with an additional snap-lock structure, which cooperates with the snap-lock structure of the connecting part to make it possible to adjust a distance between the connecting part and the anchoring part.

Known from DE 198 07 953 A1 is a device for connecting an add-on part to a carrier part, which device is provided with a receiving part. In this device, the receiving part is implemented with a baseplate that can be connected to the add-on part. The central region of the baseplate is configured with a round recess, from the rim of which three comparatively thin arms extend spirally inward. The arms terminate inwardly at a closed inner ring. On the side of the baseplate oriented away from the add-on part, the receiving part is configured with a pocket into which a roundish flange disk of a connecting part can be inserted through an insertion slit that surrounds an interpiece of the connecting part. The radial dimensions of the flange disk and the interpiece are smaller than those of the pocket and the insertion slit. The connecting part is provided with an additional flange disk that is disposed outside the pocket, a wall of the pocket that is parallel to the baseplate being fitted between the flange disks. Implemented on the baseplate-facing side

of the flange disk that is disposed inside the pocket is a dome-like elevation, which is positioned inside the inner ring after the connecting part is fitted into the receiving part. As a result, the connecting part is laterally translatable in two directions for purposes of tolerance compensation.

The object of the invention is to specify a device of the kind cited at the beginning hereof which has high stability and can be subjected to comparatively large extractive forces, and at the same time has good tolerance compensation combined with simple construction.

This object is achieved according to the invention by means of a device of the aforesaid kind having the characterizing features of Claim 1.

The fact that in the inventive device, the arms are bent, at least segmentally, and the flange disks clasp the arms and, edgewise, the plate-shaped region to which the arms are outwardly attached yields a connection between the receiving part and the connection part that is very stable and is also resistant to comparatively high traction forces, with good tolerance compensation in a total of three dimensions.

Further practical embodiments of the invention are the subject of the dependent claims.

Additional practical embodiments and advantages will become apparent from the following description of a preferred exemplary embodiment of the invention, provided with reference to the figures of the drawing. Therein:

Figure 1 is a perspective exploded view of a preferred exemplary embodiment of the invention, comprising an add-on part, a connecting part and an anchoring part,

Fig. 2, depicting the exemplary embodiment of Fig. 1, is a section through an interpiece of the connecting part, looking toward the add-on part, and

Fig. 3 is a longitudinal section through the exemplary embodiment of Figs. 1 and 2 in an installed situation, with a carrier part and an add-on part.

Figure 1 illustrates, in a perspective exploded view, a preferred exemplary embodiment of the invention comprising an add-on part 1, a connecting part 2 and an anchoring part 3.

The anchoring part 3 is provided with a substantially cylindrical anchoring bush 4 comprising two mutually opposite, laterally protruding anchoring tabs 5. The anchoring bush 4 can be fitted into a recess of a carrier part (not shown in Fig. 1), causing anchoring tabs 5 to engage with the carrier part. In addition, anchoring part 3 is configured with a shield 6 that is disposed at the back end of anchoring bush 4 (as viewed in the direction of insertion of anchoring part 3) and projects radially beyond anchoring bush 4. Shield 6 is open in the direction of the free end of anchoring bush 4. Present at the free end of anchoring bush 4 are inward-bent, bar-like edge tabs 7 configured at their outer ends with snap noses 8 forming a snap-lock structure.

Connecting part 2 is provided with a bolt shaft 9, on a free end of which a forwardly beveled insertion tip 10 is formed. In the region of insertion tip 10, bolt shaft 9 is provided with a number of snap rings 11, which constitute an additional snap-lock structure and, as described in more detail below, cooperate with the snap noses 8 when bolt shaft 9 is inserted into anchoring bush 4. At the opposite end from snap rings 11, a number of flexible sealing rings 12 are formed on bolt shaft 9. At the opposite end from insertion tip 10, connecting part 2 is provided with an outer, first flange disk 13 and an inner, second flange disk 14, which are configured as roundish and are spaced apart from each other in the longitudinal direction of connecting part 2, so that a gap 15 is formed between flange disks 13, 14.

In the exemplary embodiment illustrated in Fig. 1, receiving part 1 is configured, very advantageously from a production engineering standpoint, as a flat, rectangular plate 16, whose thickness is substantially the same as the distance between flange disks 13, 14 of connecting part

2. Formed in plate 16 and oriented parallel to the shorter edges are a first oblong hole 17 and a second oblong hole 18 adapted to receive correspondingly dimensioned connection bars of an an-add part not illustrated in Fig. 1.

Formed in the central region of plate 16 are a number of arms 19, which are attached at their outer ends to a roundish inside edge 20 of plate 16 whose inner diameter is smaller than the outer diameter of the two flange disks 13, 14, and which extend inwardly such that they bend away from a radial direction, and which are joined to an open inner ring 21 serving as a receiving element. Inner ring 21 is provided with a beveled and substantially radially oriented guide nose 23 bordering on an insertion opening 22, and an arresting nose 25 that is bent and points by a resilient snap-lock end 24 in the direction of inner ring 21. Opposite insertion opening 22, plate 16 is configured with an insertion slit 26 oriented substantially parallel to the shorter edges and extending from inside edge 20 to the outside of plate 16.

Figure 2 shows a section, based on the exemplary embodiment of Fig. 1, through an interpiece 27 connecting the two flange disks 13, 14 of connecting part 2, looking in the direction of add-on part 1. In the representation of Fig. 2, interpiece 27, having been guided through insertion slit 26 and insertion opening 22, is disposed within inner ring 21, in which process the snap-lock end 24 of arresting nose 25, after deflecting, engages behind interpiece 27 and thereby prevents it from slipping out.

It is further apparent from Fig. 2 that in the exemplary embodiment shown, each arm 19 is provided with an outer arm segment 28 that bends away from the direct connecting line between the regions of fixation of the arm 19 concerned to inside edge 20 and to inner ring 21, and an inner arm segment 29 that also bends away from this direct connecting line, the two segments being oriented roughly perpendicularly to each other. Each arm 19 thereby lends inner ring 21 relatively high mobility in the plane of plate 16, so that connecting part 2 is able to move in both directions perpendicular to the longitudinal direction of connecting part 2 to bring about

tolerance compensation. Since the two flange disks 13, 14 clasp plate 16 in the region of inside edge 20, high transverse stability is also present, and connecting part 2 is connected to receiving part 1 fixedly in the longitudinal direction.

Figure 3 is a longitudinal section through the exemplary embodiment of Figs. 1 and 2 in an installed situation with an add-on part 30 connected to receiving part 1 and with a carrier part 31 connected to anchoring part 3, wherein bolt shaft 9 is inserted into anchoring bush 4 but snap noses 8 and snap rings 11 of the snap-lock structures are not yet engaged with one another. It is apparent from Fig. 3 that the snap noses 8 formed on snap tabs 7 are disposed in pairs opposite each other in different longitudinal positions whose spacing in each case is equal to half the distance between the snap rings 11. This results in a relatively fine gradation for the relative positioning of receiving part 1 and anchoring part 3 in the longitudinal direction.

It can also be appreciated from Fig. 3 that after bolt shaft 9 is inserted all the way into anchoring bush 4, sealing sings 12 form a sort of labyrinth seal, while shield 6 is pressed against the side of carrier part 31 that faces add-on part 30 and thereby seals the recess made in carrier part 31 to receive anchoring part 3. Very good sealing of carrier part 31 is achieved in this manner.

Finally, Fig. 3 makes it apparent that the connection produced by the engagement of both flange disks 13, 14 of connecting part 2 with plate 16 of receiving part 1 is resistant even to the relatively high extractive forces needed to disengage the interlock between snap noses 8 and snap rings 11.